PTN Electronics

HDMI Matrix Switcher 4x4 MHD44

User Manual

Please read this manual carefully before using this product.

Notes：

This HDMI Matrix Switchers User Manual is only for the Matrix model MHD44.

This manual is only an instruction for operators, not for any maintenance usage. The functions described in this version are updated till Jun 2011. Any changes of functions and parameters since then will be informed separately. Please refer to the dealers for the latest details.

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All product function is valid till 2011-6-18

⚠ Safety Operation Guide

In order to guarantee the reliable operation of the equipments and safety of the staff, please abide by the following proceeding in installation, using and maintenance:

(1)

The system must be earthed properly. Please do not use two blades plugs and ensure the alternating power supply ranged from 100v to 240v and from 50Hz to 60Hz.

(2)

Do not put the switcher in a place of too hot or too cold.

(3)

As the power generating heat when running, the working environment should be maintained fine ventilation, in case of damage caused by overheat.

(4)

Please cut off the general power switch in humid weather or left unused for long time.

(5)

Before following operation, ensure that the alternating current wire is pull out of the power supply:

A. Take off or reship any components of the equipment.

B. Take off or rejoin any pin or other link of the equipment.

(6)

As to non-professional or without permission, please DO NOT try to open the casing of the equipment, DO NOT repair it on your own, in case of accident or increasing the damage of the equipment.

(7)

DO NOT splash any chemistry substance or liquid in the equipment or around.

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1. Introduction

1.1 About HDMI Matrix Switcher System

MHD44 Matrix switcher is a high-performance digital signal switcher that can be used for cross switching of multi computer and audio signal. Independent HDMI component and I/O terminals make each component signal transmit and switch separately; this design can reduce attenuation of signal transmission to minimum and output the image and audio signal in high-fidelity quality.

MHD44 switcher mostly apply in broadcasting TV engineering, multi-media meeting room, big screen display engineering, television education, command control center or other fields. A/V timing or separating switching function. With RS232 interface, it can be worked with PC, remote control system and any other far-end control system devices.

2. MHD Packing of the Product

HDMI Matrix Switcher

IR remote

RS-232 Communication Cord

Power Supply Cord

CD

User Manual and Quality Guarantee

3. MHD Installation

MHD matrix switchers adopt metal shell and can be stacked with other device. Moreover, they are rack-mountable enclosure and can be installed in the standard 19 inches case.

4. Front View and Rear View of the Product

4.1 Front view of MHD44

4.2 Rear view of MHD44

5. External Connection

5.1 Introduction of the Input and Output Connectors

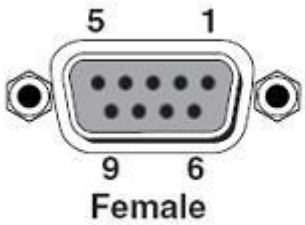
According to different type of matrix, computer signal I/O interface are made up of 4-channel HDMI ports and DVI-D female ports respectively (digital audio included). Please refer to shell silk-screen figure about other types of interface.

5.2 Connection of RS-232 Communication Port

Except the front control panel, the HDMI matrix switcher can be control by far-end control system through the Ethernet control via the RS-232 communication port.

5.2.1 Connection with Control System

With the RS-232 port, the HDMI matrix switchers can be control by several kinds of control systems.



This RS-232 communication port is a female 9-pin D connector. The definition of its pins is as the table below.

No.	Pin	Function
1	N/u	Unused
2	Tx	Transmit
3	Rx	Receive
4	N/u	Unused
5	Gnd	Ground

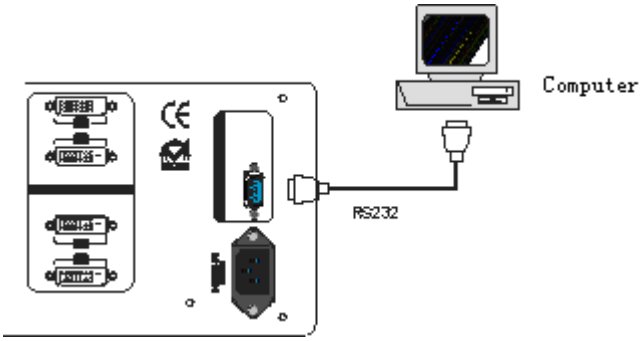
6	N/u	Unused
7	N/u	Unused
8	N/u	Unused
9	N/u	Unused

F 5-1 9HDF

5.2.2 Connection with Computer

When the switcher connects to the COM1 or COM2 of the computer with control software, users can control it by that computer.

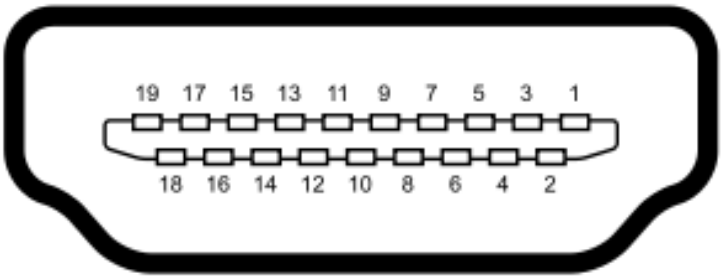
To control the switcher, users may use the public COM software. Please refer the details in Communication Protocol and Command Codes



F 5-2 MHD connecting to computer

5.3 How to Connect with the Input and Output Terminals

The HDMI matrix switchers may take DVD players, computers, graphic workstations and digital showing platform as their input signal source, and projectors, video recorders, displayers and amplifiers as their output signal destinations according to different situation.



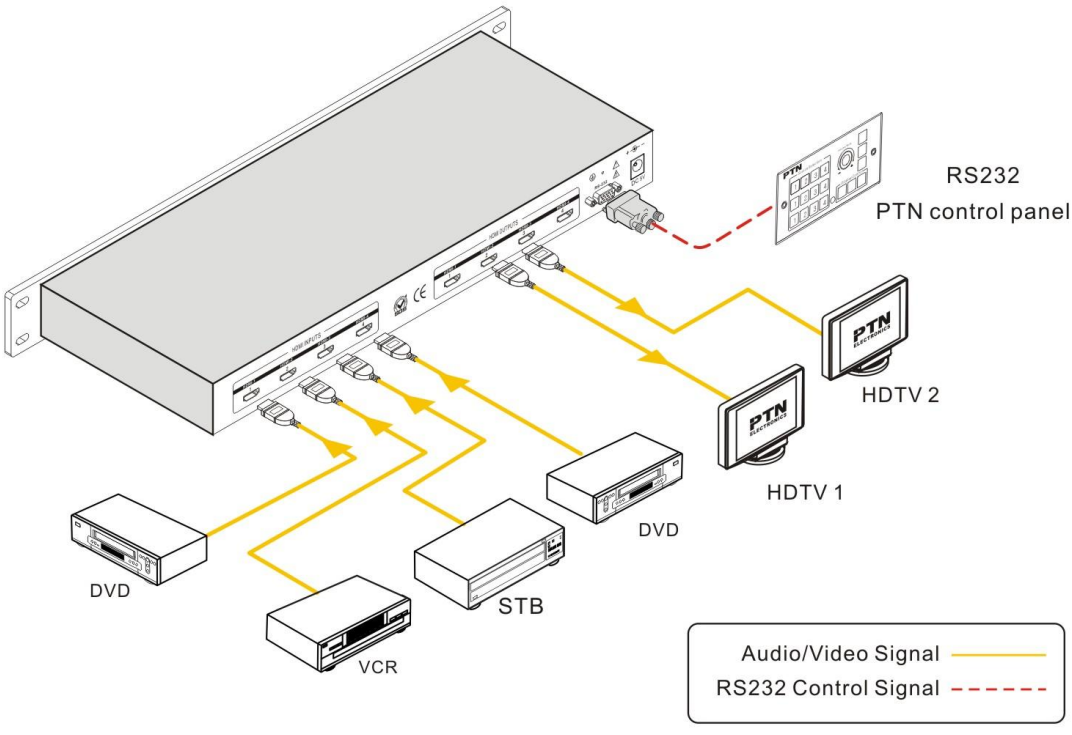
F5—3 HDMI connector

HDMI pin function

Pin Number	Signal Name	Pin Number	Signal Name
1	TMDS Data 2+	**20**	SHELL
2	TMDS Data 2 Shield	**19**	Hot Plug Detect
3	TMDS Data 2-	**18**	+5V Power

4	TMDS Data 1+	**17**	Ground
5	TMDS Data 1 Shield	**16**	DDC Data
6	TMDS Data 1-	**15**	DDC Clock
7	TMDS Data 0+	**14**	No Connect
8	TMDS Data 0 Shield	**13**	CEC
9	TMDS Data 0-	**12**	TMDS Clock-
10	TMDS Clock+	**11**	TMDS Clock Shield

System Diagram：



F5-4 HDMI matrix system connection

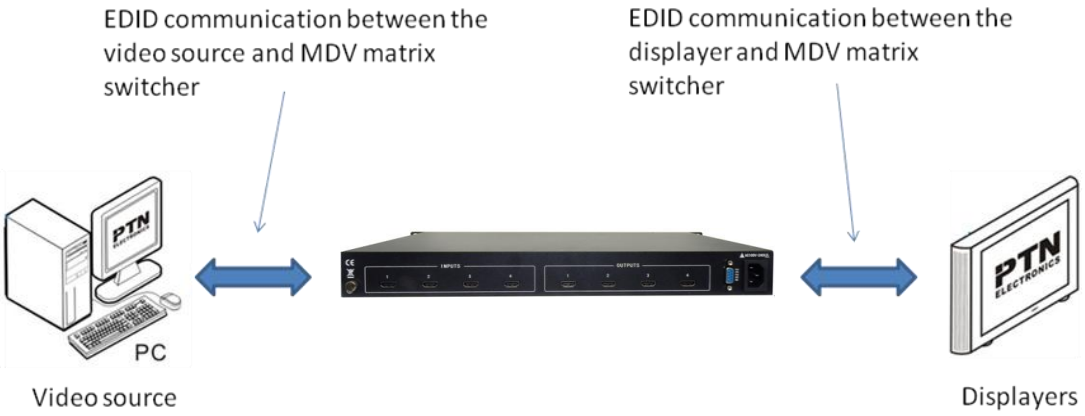
6. Operation of the EDID management

MHD matrix switcher is built in the EDID management database. The EDID management can be automatically shake hand, or manual exchanged, and factory restore.

6.1 EDID automatically shake hand

The MHD matrix switcher is built in the EDID data, which can communicate with the displayers and video source automatically. When the displayers or video sources are connected to the MHD matrix switcher, they will share the EDID/DDC information with the matrix switcher.

The communication solution is like this:


EDID communication between the video source and MDV matrix switcher
EDID communication between the displayer and MDV matrix switcher
PC
Video source
Displayers

The MHD EDID database includes most popular displaying data, but not all the displaying data because of the capability and firmware limitation. So, we can manually refresh the EDID data to update the EDID data base.

6.2 EDID management of MHD44

The RS232 commands for EDID management of MHD44 include: ”EDIDMon.” & ”EDIDMoff.” (Please notice the text-transform, and the dot in behind.)
These two commands only accept by MHD44, in the other MHD matrix models they are unavailable.

6.2.1 Erase and Refresh the EDID data

When the “EDIDMOn.” is sent, MHD44 will auto copy the mix EDID data of all outputs. It means the MHD44 will erase the old EDID data, and copy the EDID data which all output displays have.

6.2.2 EDID restore to factory default

When we send the “EDIDMoff.” to the MHD matrix switcher, it will recover the factory default EDID data.

6.2.3 RS232 feedback:

When the “EDIDMOn.” or “EDIDMoff.” is correctly sent, all the connected displayers will be blank for

2~3 seconds and recover again. And, MHD44 will send out a RS232 feedback command “EDIDMOn.” or “EDIDMoff.”.

7. Operation of the Control Panel

7.1 Front Panel Description

“AV” AV synchronal button: To transfer video and audio signal synchronously by the switcher
Example: To transfer both the video and the audio signals from input channel No.3 to output channel No.4.
Operation: Press buttons in this order “AV”,“3”,, “4””.

“VIDEO” Video button: To transfer only video signals from input channel to output channel
Example: To transfer video signals from input channel No.3 to output channel No.4.
Operation: Press buttons in this order “VIDEO”, “3”, “4”.

“AUDIO” Audio button: To transfer only audio signals from input channel to output channel
Example: To transfer audio signals from input channel No.2 to output channel No.3.
Operation: Press buttons in this order ““AUDIO”, “2”, “3””.

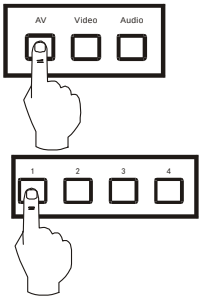
“1,2,3,4” I/O Keypads: Keys to select I/O channels.
Example: To transfer input channel No.3 to output channel No.1
Operation: Press buttons in this order: “3” in INPUT area, “1” in OUTPUT area.

7.2 Command Format of the Switching Operation

With the front control panel, the switcher could be control directly and rapidly by pressing the buttons under below format.
“Menu” +“Input Channel” +“Output Channel 1”
“Menu”: “AV”, “Audio”, “Video”
“Input Channel”: Fill with the number of input channel to be controlled
“Output Channel”: Fill with the number of output channels to be controlled

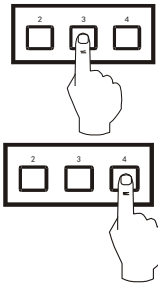
7.3 Examples of Operation

Example 1: To transfer video and audio signals from input channel No.1 to output channel No.3,4



1, Press the button for switching mode “AV” for the switching mode of video and audio (“Audio” for the switching mode of audio only; “Video” for the switching mode of video only)

2, Press the button for input channel number“1”



3, Press the button for the first output channel number “3”

„

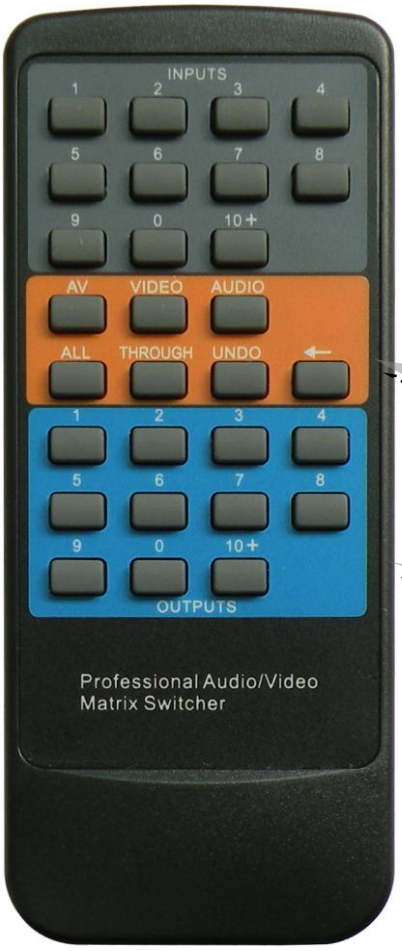
4, Press the button for the second output channel number “4”

Then, switching OK! audio/video switching from “1” to “3” and “4”

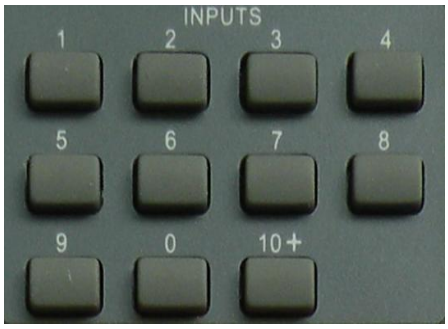
8. Usage of the Remote Controller

With the infrared remote controller, the matrix switcher could be control remotely. Because the function buttons on the remote controller are the same with the ones on the front control panel, the remote controller shares the same control operation and command format with the control panel.

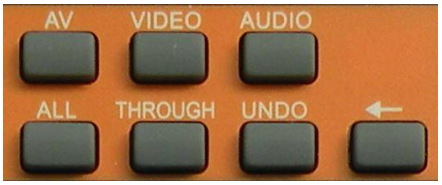
☐ 3 steps Operation



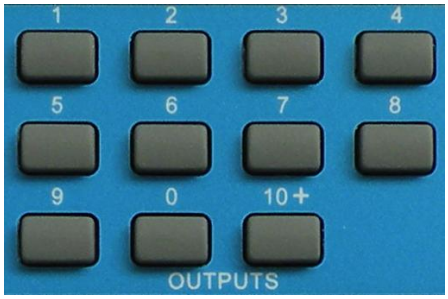
The inputs channels, from 0~9, and plusing “10+” for more



Menu, for switching source and function



The outputs channels, from 0~9, and plusing “10+” for more



9. Communication Protocol and Command Codes

With this command system, the RS232 software is able to control and operate the MHD Matrix with remotely.

Communication protocol:

Baud rate: 9600 Data bit: 8 Stop bit: 1 Parity bit: none

Command Types	Command Codes	Functions
System Command	/*Type;	Inquire the models information.
	/%Lock;	Lock the keyboard of the control panel on the Matrix.
	/%Unlock;	Unlock the keyboard of the control panel on the Matrix.
	/^Version;	Inquire the version of firmware
	/:MessageOff;	Turn off the feedback command from the com port. It will only show the “switcher OK”.
	/:MessageOn;	Turn on the feedback command from the com port.
	EDIDMOn.	Enable auto EDID management.
	EDIDMOff.	Disable auto EDID management.
	Undo.	To cancel the previous operation.
	Demo.	Switch to the “demo” mode, 1->1, 2->2, 3->3 … and so on.
Operation Command (PTN2.0 Command System)	[x1]All.	Transfer signals from the input channel [x1] to all output channels
	All#.	Transfer all input signals to the corresponding output channels respectively.
	All$.	Switch off all the output channels.
	[x1]#.	Transfer signals from the input channel [x1] to the output channel [x1].
	[x1]$.	Switch off the output channel [x1].
	[x1] V[x2].	Transfer the video signals from the input channel [x1] to the output channel [x2].
	[x1] V[x2],[x3],[x4].	Transfer the video signals from the input channel [x1] to the output channels [x2], [x3] and [x4].
	[x1] A[x2].	Transfer the audio signals from the input channel [x1] to the output channel [x2].
	[x1] A[x2],[x3],[x4].	Transfer the audio signals from the input channel [x1] to the output channels [x2], [x3] and [x4].
	[x1] B[x2].	Transfer both the video and the audio signals from the input channel [x1] to the output channel [x2].
	[x1] B[x2],[x3],[x4].	Transfer both the video and the audio signals from the input channel [x1] to the output channels [x2], [x3] and [x4].

	[x1]P[g].	Transfer both the video and the audio signals from the input channel [x1] to the output group [g].
	[g]PP[x2],[x3],[x4].	Together the output channels [x2], [x3] and [x4] to the output group [g].
	S[g].	Inquire the output channels of output group [g].
	Status[x1].	Inquire the input channel to the output channel [x1].
	Status.	Inquire the input channel to the output channels one by one.
	Save[Y].	Save the present operation to the preset command [Y]. [Y] ranges from 0 to 9.
	Recall[Y].	Recall the preset command [Y].
	Clear[Y].	Clear the preset command [Y].

Note:

1. [x1], [x2], [x3] and [x4] are the symbols of input or output channels ranged according to the model of the matrix switcher. If the symbols exceed the effective range, it would be taken as a wrong command.
2. In above commands, "["and "]" are symbols for easy reading and do not need to be typed in actual operation.
3. Please remember to end the commands with the ending symbols "." and ";".

Detail Examples:

1、 Transfer signals from an input channel to all output channels: [x1]All.
Example: To transfer signals from the input channel No.3 to all output channels. Run Command: "3All."

2、 Transfer all input signals to the corresponding output channels respectively: All#.
Example: If this command is carried out on an MVG1616-A matrix switcher, the status of it will be: 1->1, 2->2, 3->3, 4->4……16->16.

3、 Switch off all the output channels: All$.
Example: After running this command, there will be no signals on all the output channels.

4、 Check the version of the firmware: /^Version;
To check the version of the firmware.

5、 Switch off the detail feedback command from the COM port: /:MessageOff;
Switch off the detail feedback information from the COM port. But, it will leave the "switch OK" as the feedback, when you switch the matrix.

6、 Switch on the detail feedback command from the COM port: /:MessageOn;
Switch on the detail feedback information from the COM port. it will show the detail switch information when it switch. Example: when switch 1->2 for Audio, it will feedback "A0102".

7、 Transfer signals from an input channel to the corresponding output channel: [x]#.
Example: To transfer signals from the input channel No.5 to the output channel No.5. Run Command: "5#."

8、Switch off an output channel: [x]$.
Example: To switch off the output channel No.5. Run Command: "5$."

9、Switch both video and audio signals synchronously: [x1] B[x2].
Example: To transfer both the video and the audio signals from the input channel No.120 to the

output channel No.12,13,15. Run Command: “120B12,13,15.”

10、Transfer both the video and audio signals from input channel [x1] to output group [g]: [x1]P[g].

Example: If together the output channel NO.1,3,5,7 to output group NO.2 by sent the command “2PP1,3,5,7.”, then when send the command “1P2.”, the matrix will transfer both the video and the audio signals from the input channel No.1 to output channel NO.1,3,5,7.

When you want to make a group [g], you should clear this group first. The command for clear group is “[g]P0.”.

11、Inquire the input channel to the output channel [x]: Status[x].

Example: To inquire the input channel to the output channel No.23. Run Command: “Status23.”

12、Inquire the input channel to the output channels one by one: Status.

Example: To inquire the input channel to the output channels one by one. Run Command: “Status.”

13、Save the present operation to the preset command [Y]: Save[Y].

Example: To save the present operation to the preset command No.7. Run Command: “Save7.”

14、Recall the preset command [Y]: Recall[Y].

Example: To recall the preset command No.5. Run Command: “Recall5.”

15、Clear the preset command [Y]: Clear[Y].

Example: To clear the preset command No.5. Run Command: “Clear5.”

10. Specification

Video Input		Video Output	
Input	HDMI	Output	HDMI
Input Connector	HDMI 1.3	Output Connector	HDMI 1.3
Input Level	T.M.D.S. 2.9V/3.3V	Output Level	T.M.D.S. 2.9V/3.3V
Input Impedence	75Ω	Output Impedence	75Ω
Video General			
Gain	0 dB	Bandwidth	340 MHz (10.2 Gbit/s)
Video Signal	HDMI (or DVI-D)	Maximum Pixel Clock	165MHz
Resolution Range	Up to 1920 x 1200 or 1080P@60Hz	Switching Speed	200ns (Max.)
Consumer Electronics Control (CEC)	Supports CEC wired infrared data pass-through using the HDMI 1.3 standard		
EDID and DDC Management	Supports Extended Display Identification Data (EDID) and Display Data Channel (DDC) data using DVI and HDMI standards, EDID and DDC signals are actively buffered. The built-in EDID/DDC database can analyze these two signals, mix them, and realize the handshake of them internally.		
HDCP Management	Compliant with High-bandwidth Digital Content Protection (HDCP) using DVI and HDMI 1.3 standards. The built-in HDCP management technology can analyze HDCP key, and realize the handshake internally.		
Audio General			
Digital Audio	Supports HDMI audio transmitted through the RGB and Y, Cr, Cb lines, actively buffered		
Control Parts			
Serial Control Port	RS-232, 9-pin female D connector	Pin Configurations	2 = TX, 3 = RX, 5 = GND
IR Remote	Default IR remote	Front Panel Control	Buttons
Options	TCP/IP control by PTNET(PTN's programmable interface)		
General			
Power Supply	100VAC ~ 240VAC, 50/60Hz	Power Consumption	25W
Temperature	-20 ~ +70℃	Humidity	10% ~ 90%
Case Dimension	W483 x H44 x D235mm (1U high, full rack wide)	Product Weight	1.5Kg

11. Troubleshooting & Maintenance

1) When the output image in the destination device connected to theHDMI Matrix (MHD) has ghost, such as the projector output with ghost, please check the projector's setting or try another high quality connection cord.

2) When there is a color losing or no video signal output,， Maybe the HDMI cables haven't been connected asHDMI criterion

3) When the remote controller doesn't works:
   A. Maybe the battery is run out of, please change a new one.
   B. Maybe the controller is broken, please ask the dealer to fix it.

4) When user can not control the HDMI Matrix (MHD) by computer through its COM port, please check the COM port number in the software and make sure the COM port is in good condition.

5) If there is not "beep" sound when switching the I/O signal, please make sure the beeper is switched-on. If so, the beeper inside the matrix may be broken. Please send it to the dealer for fixing.

6) When switching , the beeper beeps but without any output image：
   A. Check with oscilloscope or multimeter if there is any signal at the input end. If there is no signal input, it may be the input connection cord broken or the connectors loosen.
   B. Check with oscilloscope or multimeter if there is any signal at the output end. If there is no signal output, it may be the output connection cord broken or the connectors loosen.
   C. Please make sure the destination device is exactly on the controlled output channel
   D. If it is still the same after the above checking, it may be something wrong in the switcher. Please send it to the dealer for fixing.

7) If the output image is interfered, please make sure the system is earthed well.

8) If the static becomes stronger when connecting the HDMI connectors, it may be due to the incorrect earthling of the power supply, Please earth it again correctly, and otherwise it would bring damage to the switcher or shorten its natural life.

9) If the Matrix can not be controlled by the keys on the front panel, RS232 port or remote controller, the host may has already been broken. Please send it to the dealer for fixing.

Remarks: For any more questions or problems, please try to get help from your local distributor, or email PTN at support@PTN-electronics.com.